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The Infrageneric Positions of East Asian Species of *Vicia* (Leguminosae)

Yasuhiko ENDO[a] and Hiroyoshi OHASHI[b]

[a]Natural History Museum and Institute, Chiba, Aoba-cho, Chuo-ku, Chiba, 260 JAPAN;
[b]Biological Institute, Graduate School of Science, Tohoku University, Sendai, 980-77 JAPAN

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Sixteen East Asian species of *Vicia* were morphologically studied to decide their infrageneric taxonomic positions. Nine species were reconfirmed as being included in the section Vicilla of subgenus Vicilla and three, *V. bifolia* Nakai, *V. chosenensis* Ohwi, and *V. fauriae* Franch., were newly placed in the section Vicilla. The remaining four, *V. amurensis* Oettingen, *V. dichroantha* Diels, *V. nummularia* Hand.-Mazz., and *V. tibetica* Fisch., were placed in a new section, Amurense Y. Endo & H. Ohashi. This new section is characteristic in having pollen grains with swollen mesocolpium, terete styles, abaxially sprouting stylar hairs, and globose stigmas.

The infrageneric positions of the East Asian species of *Vicia* were studied by Kupicha (1976). She examined 10 species and placed them all in the section Vicilla of the subgenus Vicilla in the genus. After Kupicha's study, four Asian species were newly placed in the section Vicilla by He and He (1994).

The genus *Vicia* is composed of two subgenera, Vicilla and Vicia, and 22 sections (Kupicha 1976). The section Vicilla is one of the 17 sections of subgenus Vicilla. This section has the following diagnostic characteristics; a dorsally compressed style evenly hairy all-round, hypostomatic leaves, and more or less oblong vexilla (Kupicha 1976).

Vicia amurensis is one of the East Asian species of section Vicilla, but, Endo (1994) recognized that the species had a terete style. Other features of the species are common with those of section Vicilla. On the other hand, Endo and Ohashi (in press) found that the pollen grains of this species differ from those of other species of the section in having a swollen mesocolpium. Other species of the section Vicilla have a plain mesocolpium. From these facts we thought that the taxonomic position of *V. amurensis* needs to be reconsidered.

The swollen mesocolpium was also found in other two East Asian species, i.e., *Vicia dichroantha* and *V. tibetica* (Endo and Ohashi in press). The former was also included by Kupicha (1976) in the section Vicilla, but the latter was not treated in her system. Except for *V. tibetica*, several Asian species were not treated in the system. In the present study, to determine their infrageneric positions we examined *V. amurensis, V. dichroantha*, and other Asian species of *Vicia* which had not been placed in infrageneric positions.

Materials and Methods

We examined 17 species of *Vicia* of which 16 were Asian and one was European. The European species, *V. pisiformis*, was selected for comparative study because it is the type species of the section Vicilla. Shapes of styles, stigmas, standard petals and pollen grains, and the Stomatal Index Ratio (= S.I.R. formula was explained by Kupicha in 1976) were examined.

Floral organs were observed under a dissecting microscope and SEM. For SEM, these organs were obtained from flowers suspended in FAA (50% ethanol: formalin: acetic acid = 17:2:1), and dehydrated by an ethanol series. After dehydration, the ethanol was removed by isoamylacetate. Following critical point drying, the materials were sputter-coated with platinum-palladium (Pt-Pd) and observed under a Hitachi S-800 scanning electron microscope (SEM). The calculation of S.I.R. was done according to Kupicha's (1976) method.

Pollen grains were obtained from herbarium specimens in CBM, H, KYO, TI and TUS, and acetolysed by the Erdtman method (1960). Then, they were dehydrated by an ethanol series. After dehydration, the grains were treated by the same method as for the observation of floral organs with SEM. The sizes of pollen grains were measured 30 grains from one specimen on the CRT (cathode ray tube) of the SEM.

Voucher specimens of the species examined are listed in the appendix.

Taxonomic characters

The styles of species examined are dorsally compressed or terete. The distribution of the stylar shapes is listed for the species examined in Table 1.

Styles are covered with hairs (= the pollen brush sensu Lavin and Delgado in 1990), and are evenly hairy all-round at their mature stage (Fig. 1). The patterns of the appearance of these pollen brushes are classified into two types. One is the appearance on abaxial surface of styles (Fig. 2) and the other is on all-round stylar surfaces. In the species examined, the distribution of these types is listed in Table 2.

The shapes of the standard petals (= vexilla) of *Vicia* were classified into three types by Kupicha (1976), i.e., oblong, stenonychioid, and platonychioid. In the species examined, we observed oblong vexilla (Figs. 3, 4), stenonychioid ones (Figs. 5, 6), and their intermediate shapes (Figs. 7, 8). For the presence of the intermediate shapes, we cannot clearly define the circumscriptions of the two types, oblong and stenonychioid. On the other hand, we find a distinct shape of a vexillum whose claw is extremely wider

Table 1. Distribution of the dorsally compressed style and the terete style in 14 *Vicia* species

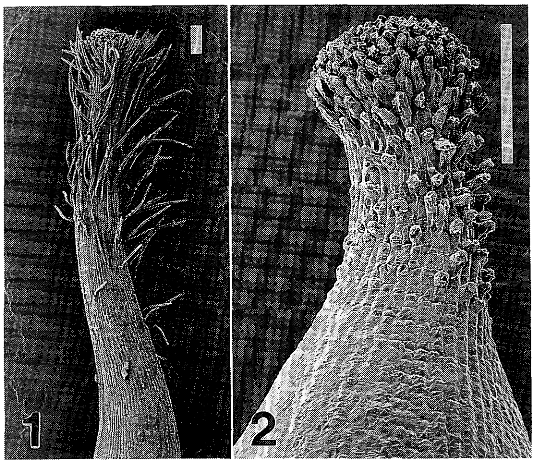
Species	Stylar shapes[a] (Kupicha 1976)	Stylar shapes[a] (present study)	Voucher specimens
V. amoena	D	D[b]	
V. amurensis	D	T[b]	
V. bifolia	*	D	Y. Endo 594
V. chosenensis	*	D	T. Nakai in 1909
V. dichroantha	D	T	H. Sun in 1995
V. fauriae	*	D	Y. Endo 591
V. japonica	*	D[b]	
V. kulingiana	D	*	
V. nipponica	*	D	Y. Endo 501
V. nummularia	*	T	H. Sun in 1995
V. pisiformis	D	*	
V. pseudo-orobus	D	D[b]	
V. tibetica	*	T	F. K. Ward 19307
V. unijuga	*	D	Y. Endo 587
V. venosa var. *cuspidata*	*	D	Y. Tateishi in 1981

[a]D = dorsally compressed style, T = terete style.
[b]Data from Endo (1994).
*Species not treated.

Table 2. Distribution of stylar hair patterns in 11 *Vicia* species

Species	Patterns of appearance of stylar hairs[a]	Voucher specimens
V. amoena	al	Y. Endo 2918
V. amurensis	ab	Y. Endo 2873
V. bifolia	al	Y. Endo 589
V. dichroantha	ab	H. Sun in 1995
V. fauriae	al	A. Takehara in 1983
V. japonica	al	Y. Endo 3083
V. nipponica	al	Y. Endo 794
V. nummularia	ab	H. Sun in 1995
V. pseudo-orobus	al	Y. Endo 2427
V. unijuga	al[b]	
V. venosa var. *cuspidata*	al	Y. Endo 2423

[a] al = stylar hairs appear all-round a style, ab = stylar hairs appear abaxially.
[b] Data from Endo and Ohashi (1995).



Figs. 1, 2. SEM photographs of lateral views of *Vicia amurensis* styles. 1; just before anthesis. 2; sprouting of stylar hairs in young flower. Left sides adaxial surfaces. Scale bars = 1 mm. Voucher specimen: Y. Endo 2873.

than its banner (Fig. 9). This type of vexillum was not reported by Kupicha (1976).

The S.I.R. of species examined are shown in Table 3. The variation of S.I.R. is classified into three categories based on those of Kupicha (1976) as follows: hypostomatic when S.I.R. = 0, hypo-amphistomatic when $0 < \text{S.I.R.} < 1$, and epi-amphistomatic when $\text{S.I.R.} > 1$. The distribution of these categories is also listed in Table 3.

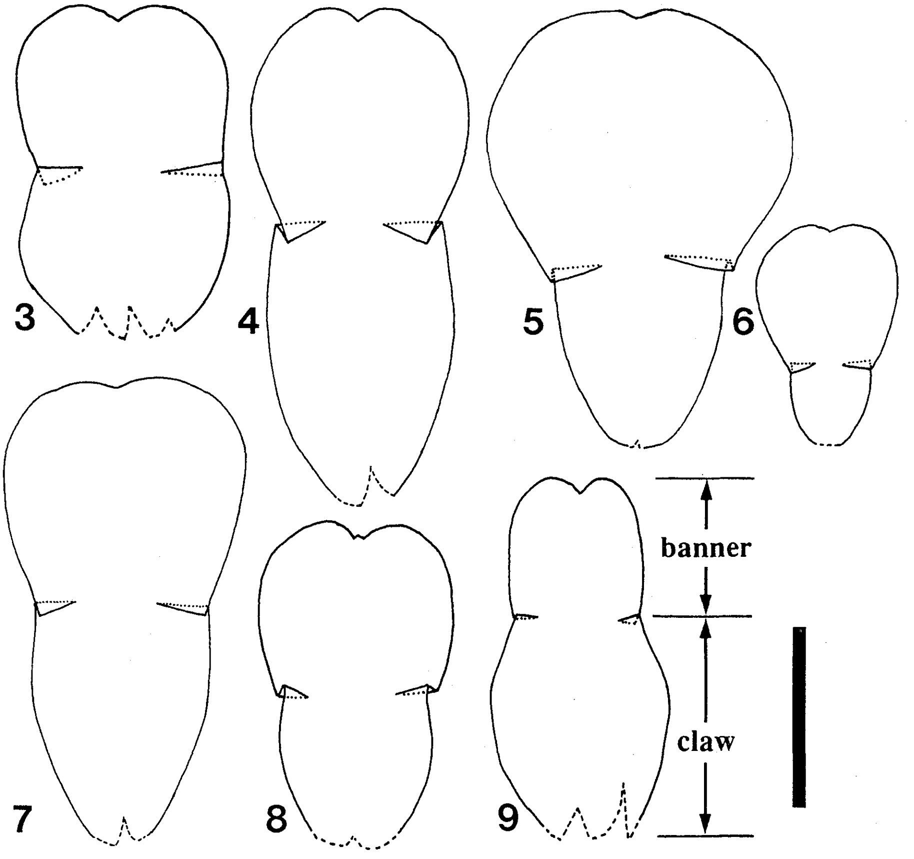
Stigma shapes of the tribe Vicieae were arbitrarily classified into three types, i.e., conical, disc and globose (Gunn and Kluve 1976). Stigmas of species examined were globose (Fig. 2) or conical. The distribution of these stigma types is listed in Table 4.

The general features of the pollen grains of genus *Vicia* were reported by Clarke and Kupicha (1976), and Endo and Ohashi (in press). In the present study, we find that the mesocolpia of the pollen grains of *V. nummularia* are swollen (Fig. 10). The distribution of the swollen mesocolpium in the species examined is listed in Table 5. Sizes of the pollen grains are shown in Table 6.

Discussion

To evaluate the character states of the features observed, we compared these features with those of related out-groups. For the out-groups, we must choose the species from tribes related to the tribe Vicieae because of the paraphyly of *Vicia*. The reason of the choice was explained by Endo and Ohashi (1995) in detail.

The tribe Cicereae is one of the closely related tribes of Vicieae (Kupicha 1977). In the present study, we chose the tribe as the related out-group. *Cicer arietinum* L. was known to have a terete style



Figs. 3–9. Standard petals of six *Vicia* species. 3, 8; *V. dichroantha*. 4; *V. venosa* var. *cuspidata*. 5; *V. amoena*. 6; *V. gigantea*. 7; *V. bifolia*. 9; *V. nummularia*. Scale bar = 3 mm. Voucher specimens: 3, K. Iwatsuki et al. in 1984; 4, Y. Tateishi in 1981; 5, Y. Endo 586; 6, K. S. Chow 82092; 7, Y. Endo 594; 8, H. Sun in 1995; 9, H. Sun in 1995.

(Shivanna and Owens 1989). Therefore, we recognize that the terete style is in a plesiomorphic character state against a dorsally compressed style in *Vicia*. Stylar hairs (= pollen brush) cannot be seen in the related out-groups (Lavin and Delgado 1990). Therefore, the out-group comparison method does not clarify the evolution of stylar hair patterns in *Vicia*. Stigma shapes of the tribe Cicereae were reported as globose (Gunn and Kluve 1976). We recognize that the globose type of stigma is in a plesiomorphic character state against a conical type of stigma in *Vicia*. A swollen type of mesocolpium was already recognized as an apomorphy against a plain type of mesocolpium (Endo and Ohashi in press). The distribution of these apomorphic features in the species examined are listed in Table 7.

Vicia bifolia, *V. chosenensis*, and *V. fauriae* have diagnostic characteristics of the section Vicilla. Therefore, we conclude that these species are included in that section. The section Vicilla thus includes a total of 15 East Asian species (Table 7).

Vicia amurensis, *V. dichroantha*, *V. nummularia* and *V. tibetica* are supposed to comprise a monophyletic group in *Vicia* for the reason that the group has the synapomorphy of a swollen mesocolpium of pollen grains. We call the group Amurense. We consider that the Amurense group should be independent from the section Vicilla.

Table 3. Stomatal Index Ratio (S.I.R.)[a] of 17 *Vicia* species

Species	S.I.R. (Kupicha 1976)	S.I.R. (present study)	Voucher specimens	Distribution pattern of stomata on leaf surfaces[b]
V. amoena	0.8	0.0	Y. Tateishi et al. 9559	H or H-am
V. amurensis	0.6	0.4	M. Togashi in 1984	H-am
V. bifolia	*	0.0	Y. Endo 801	H
V. chosenensis	*	0.0	B. H. Choi in 1979	H
V. dichroantha	*	0.5	K. Iwatsuki et al. in 1984	H-am
V. fauriae	*	0.0	Y. Endo 802	H
V. gigantea	*	0.0	79th Grade in 1980	H
V. hirticalycina	*	0.1	J. Murata et S. C. Go 16178	H-am
V. japonica	*	0.9	H. Takahashi 4421	H-am
V. kulingiana	0.0	0.0	T. Z. Liou in 1935	H
V. nipponica	*	0.0	Y. Endo 493	H
V. nummularia	*	8.2	H. Sun in 1995	E-am
V. pisiformis	*	0.0	H. Kalheber 78-573	H
V. pseudo-orobus	0.0	0.3	T. Nemoto 1971	H or H-am
V. tibetica	*	1.6	F. K. Ward 19307	E-am
V. unijuga	0.0	0.0	Y. Endo 385	H
V. venosa var. *cuspidata*	*	0.0	O. Shimoda in 1981	H

[a] The formula of S.I.R. was explained by Kupicha (1976).
[b] H = hypostomatic, H-am = hypo-amphistomatic, E-am = epi-amphistomatic.
*Species not treated.

Table 4. Distribution of a conical or globose stigma in 11 *Vicia* species

Species	Stigma shapes[a]	Voucher specimens
V. amoena	C	Y. Endo 497
V. amurensis	G	Y. Endo 477
V. bifolia	C	Y. Endo 589
V. dichroantha	G	H. Sun in 1995
V. fauriae	C	Y. Endo 2379
V. japonica	C	Y. Endo 593
V. nipponica	C	Y. Endo 501
V. nummularia	G	H. Sun in 1995
V. pseudo-orobus	C	Y. Endo 800
V. unijuga	C[b]	
V. venosa var. *cuspidata*	C	Y. Endo 495

[a] C = conical stigma, G = globose stigma.
[b] Data from Endo and Ohashi (1995).

Table 5. Distribution of swollen mesocolpium of pollen grains in 16 *Vicia* species

Species	Mesocolpium[a]
V. amoena	P[b]
V. amurensis	S[b]
V. bifolia	P[b]
V. chosenensis	P[b]
V. dichroantha	S[b]
V. fauriae	P[b]
V. gigantea	P[b]
V. japonica	P[b]
V. kulingiana	P[b]
V. nipponica	P[b]
V. nummularia	S
V. pisiformis	P[b]
V. pseudo-orobus	P[b]
V. tibetica	S[b]
V. unijuga	P[b]
V. venosa var. *cuspidata*	P[b]

[a] P = plain mesocolpium of pollen grains, S = swollen mesocolpium of pollen grains.
[b] Data from Endo and Ohashi (in press).

A part of species of the Amurense group was included in the subgenus Vicilla of *Vicia* in Kupicha's (1976) system. The subgenus was characteristic in having stipules without nectariferous spots, and inflorescence usually equaling or exceeding the subtending leaf and usually many-flowered (Kupicha 1976). The Amurense group also has the same characteristics. Therefore, we choose section as the rank for

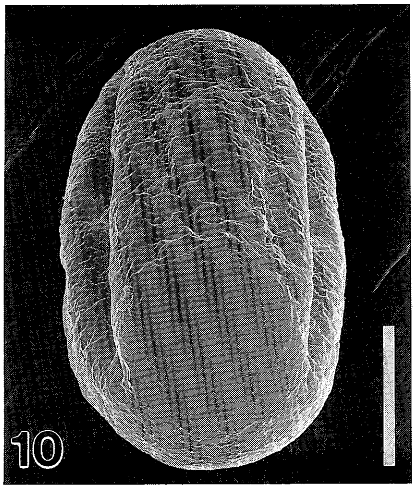


Fig. 10. SEM photograph of equatorial view of pollen grain of *Vicia nummularia*. Scale bar = 10 μm. Voucher specimen: H. Sun in 1995.

Amurense in subgenus Vicilla of genus *Vicia*.

Taxonomic treatment

Genus *Vicia* subgen. Vicilla Kupicha

Sect. Amurense Y. Endo & H. Ohashi, sect. nov.

Sectio haec ab Vicillo differt stylo tereti primum puberulo ad abaxialem, stigmate globoso, pollinis granis tumidis ad mesocolpum.

Type: *Vicia amurensis* Oettingen.

Species included; *Vicia amurensis* Oettingen, *V. dichroantha* Diels, *V. nummularia* Hand.-Mazz. and *V. tibetica* Fisch.

Distribution: Eastern Asian region sensu Takhtajan (1986).

Section Amurense has pollen grains with swollen mesocolpium, terete styles, abaxially sprouting stylar hairs, and globose stigmas.

Differences among the species of the section Amurense are shown in Table 8.

We thank the curators of the herbaria, CBM, H, KYO, TI and TUS, for loaning the specimens examined. We also thank Dr. Hu Yun-Qian of The Kunming Institute of Botany, Academia Sinica of P.R. China for sending us materials. This study was partly supported by the Monbusho International Scientific Research Program (No. 04041019 in 1992–94) to H. Ohashi from the Ministry of Education, Science, Sports and Culture, Japan.

Specimens examined

Vicia amoena Fisch.

CHINA. Inner Mongolia: Y.C. Ma 33 (TUS).

JAPAN. Miyagi Pref.: Y. Endo 497 (TUS), 586 (TUS); Y. Tateishi et al. 9559 (TUS). Saitama Pref.: (Cultivated in Miyagi Pref.), Y. Endo 594 (TUS). Yamanashi Pref.: Y. Endo 2918 (TUS).

V. amurensis Oettingen

JAPAN. Akita Pref.: Y. Endo 473 (TUS), 477 (TUS); (Cult. l.c.), Y. Endo 590 (TUS). Niigata Pref.: S. Ogawa 9 (TUS). Chiba Pref.: Y. Endo 2873 (CBM). Yamanashi Pref.: M. Togashi, Sept. 6, 1984 (TUS). Kyushu: Y. Tateishi 3540 (TUS).

V. bifolia Nakai

JAPAN. Ibaraki Pref.: T. Nagayama 553 (TUS). Saitama Pref.: (Cult. l.c.), Y. Endo 589 (TUS), 594 (TUS). Yamanashi Pref.: Y. Endo 801 (TUS). Aichi Pref.: K. Torii, July 15, 1956 (TUS); K. Torii, July 7, 1957 (TUS).

V. chosenensis Ohwi

KOREA. T. Nakai, June 17, 1909 (TI); B. H. Choi, June 4, 1979 and June 5, 1979 (TUS).

V. dichroantha Diels

CHINA. Yunnan: K. Iwatsuki et al., Aug. 28, 1984 (TUS). N.W. Yunnan: H. Sun, July 13, 1995 (CBM).

V. fauriae Franch.

JAPAN. Akita Pref.: Y. Endo 803 (TUS). Yamagata Pref.: Y. Endo 802 (TUS), 804 (TUS); (Cult. l.c.), Y. Endo 591 (TUS), 2379 (TUS). Miyagi Pref.: A. Takehara, June 25, 1983 (TUS).

V. gigantea Bunge

CHINA. Inner Mongolia: Daching-shan, 79th Grade, July 11, 1980 (TUS). Peking: K.S. Chow 82092 (TUS).

V. hirticalycina Nakai

KOREA. Fusan: U. Faurie 454 (TI). Junrannan-do: J. Murata et S.C. Go 16178 (TUS).

V. japonica A. Gray

JAPAN. Hokkaido: H. Takahashi 4421 (TUS); Y. Endo 3083 (CBM); Y. Tateishi 1929 (TUS). Akita Pref.: Y. Endo 467 (TUS); (Cult. l.c.), Y. Endo 593 (TUS). Kanagawa Pref.: Y. Satoh, Aug. 11, 1979 (TUS).

V. kulingiana Bail.

CHINA. Lu-shan: T.Z. Liou, July 10, 1935 (KYO).

V. nipponica Matsumura

JAPAN. Miyagi Pref.: Y. Endo 493 (TUS), 501 (TUS). Kagawa Pref.: T. Hirata 4 (TUS). Kyushu: Y. Endo 794 (TUS).

V. nummularia Hand.-Mazz.

CHINA. N.W. Yunnan: H. Sun, July 20, 1995 (CBM).

V. pisiformis L.

DEUTSCHLAND. Bayern: H. Kalheber 78-573 (H). USSR. Belgorod: A.K. Skvortsov, June 24, 1968 (H).

Table 6. Size of pollen grains of 16 *Vicia* species

Species and voucher specimens	P^a (μm) (min.–) $\bar{x}^c$ ± SD^d (–max.)	E^b (μm) (min.–) $\bar{x}$ ± SD (–max.)	P/E (min.–) $\bar{x}$ ± SD (–max.)
V. amoena			
Y. Endo 586	(29.2–)32.2±1.6(–35.3)	(16.4–)19.4±1.2(–21.7)	(1.5–)1.7±0.1(–1.8)
Y. C. Ma 33	(27.1–)30.3±1.4(–32.5)	(15.8–)18.0±1.1(–20.1)	(1.5–)1.7±0.1(–2.0)
V. amurensis			
Y. Endo 473	(29.1–)30.8±0.7(–32.1)	(18.4–)21.3±0.9(–23.0)	(1.3–)1.5±0.1(–1.6)
S. Ogawa 9	(27.8–)30.1±1.4(–32.5)	(19.3–)20.5±0.5(–21.7)	(1.4–)1.5±0.1(–1.6)
Y. Tateishi 3540	(25.3–)28.4±1.4(–30.5)	(18.8–)20.3±0.8(–22.3)	(1.3–)1.4±0.1(–1.5)
V. bifolia			
K. Torii in 1956	(35.4–)38.1±1.4(–41.3)	(20.5–)22.3±1.2(–20.5)	(1.5–)1.7±0.1(–1.9)
K. Torii in 1957	(34.9–)38.2±1.2(–40.3)	(20.1–)21.9±0.7(–23.5)	(1.6–)1.8±0.1(–1.9)
T. Nagayama 553	(32.0–)34.0±1.0(–35.5)	(19.7–)21.0±0.7(–22.8)	(1.5–)1.6±0.1(–1.8)
V. chosenensis			
T. Nakai in 1909	(29.4–)31.7±1.2(–34.6)	(17.6–)18.5±0.5(–19.5)	(1.6–)1.7±0.1(–1.9)
B. H. Choi in 1979	(26.6–)28.2±0.8(–29.6)	(15.4–)16.9±0.8(–18.9)	(1.5–)1.7±0.1(–1.8)
V. dichroantha			
K. Iwatsuki et al. in 1984	(29.8–)34.5±2.8(–41.0)	(18.0–)21.0±1.9(–24.5)	(1.5–)1.7±0.1(–1.5)
V. fauriae			
Y. Endo 804	(28.8–)32.2±1.6(–35.6)	(16.0–)17.7±0.7(–18.9)	(1.6–)1.8±0.1(–2.0)
Y. Endo 803	(32.7–)34.4±1.2(–36.6)	(17.2–)18.0±0.5(–18.7)	(1.8–)1.9±0.1(–2.1)
V. gigantea			
79th Grade in 1980	(26.6–)28.3±1.1(–30.7)	(16.0–)17.4±0.7(–19.5)	(1.5–)1.6±0.1(–1.8)
K. S. Chow 82092	(25.2–)28.2±1.3(–30.7)	(14.3–)17.2±1.2(–18.9)	(1.4–)1.6±0.1(–1.9)
V. japonica			
Y. Tateishi 1929	(28.9–)32.4±1.2(–34.3)	(15.7–)18.2±0.9(–19.8)	(1.6–)1.8±0.1(–2.2)
Y. Endo 467	(29.2–)31.1±0.8(–32.5)	(17.9–)19.5±0.6(–20.8)	(1.5–)1.6±0.1(–1.7)
Y. Satoh in 1979	(27.1–)30.1±1.1(–31.9)	(16.4–)18.4±0.8(–19.6)	(1.5–)1.6±0.1(–1.8)
V. kulingiana			
T. Z. Liou in 1935	(33.4–)39.1±2.3(–43.5)	(19.3–)24.7±1.6(–27.9)	(1.4–)1.6±0.1(–1.9)
V. nipponica			
Y. Endo 493	(31.5–)34.2±1.4(–36.9)	(17.1–)18.7±1.0(–21.0)	(1.6–)1.8±0.1(–2.1)
Y. Endo 794	(31.6–)33.5±0.9(–35.6)	(19.0–)20.1±0.8(–21.6)	(1.5–)1.7±0.1(–1.8)
T. Hirata 4	(33.3–)35.0±0.8(–37.2)	(18.8–)20.1±0.6(–22.1)	(1.7–)1.7±0.1(–1.9)
V. nummularia			
H. Sun in 1995	(38.6–)41.5±1.7(–45.0)	(20.7–)22.7±1.1(–24.7)	(1.6–)1.8±0.1(–2.1)
V. pisiformis			
H. Kalheber 78-573	(30.2–)32.0±1.0(–34.6)	(18.3–)19.9±0.9(–22.0)	(1.5–)1.6±0.1(–1.8)
A. K. Skvortsov in 1968	(28.4–)31.7±1.2(–34.1)	(16.9–)18.3±0.7(–20.2)	(1.5–)1.7±0.1(–2.0)
Filarszky in 1902	(29.4–)31.0±0.9(–32.7)	(17.8–)19.1±0.7(–20.8)	(1.6–)1.6±0.1(–1.8)
J. Suza in 1925	(26.2–)29.3±0.9(–30.9)	(16.4–)19.2±0.9(–21.4)	(1.4–)1.5±0.1(–1.7)
V. pseudo-orobus			
Y. Endo 799	(28.9–)31.5±1.1(–33.4)	(16.6–)18.6±0.6(–19.9)	(1.5–)1.7±0.1(–1.8)
Y. Tateishi et al. 9895	(28.6–)31.2±1.2(–33.4)	(16.8–)18.2±0.7(–19.4)	(1.6–)1.7±0.1(–2.0)
V. tibetica			
F. K. Ward 11713	(27.3–)29.8±1.4(–33.1)	(16.0–)19.6±1.6(–21.9)	(1.4–)1.5±0.1(–1.8)
V. unijuga			
H. Takahashi et al. 127	(30.0–)34.6±2.5(–38.8)	(18.0–)22.4±2.0(–25.5)	(1.4–)1.6±0.1(–1.8)
S. Ogawa et al. in 1983	(30.6–)34.1±1.5(–36.4)	(16.5–)21.9±1.5(–24.0)	(1.4–)1.6±0.1(–1.8)
Y. Endo 821	(31.4–)34.0±1.2(–36.4)	(18.9–)21.1±0.8(–22.8)	(1.5–)1.6±0.1(–1.7)
V. venosa var. *cuspidata*			
O. Shimoda in 1981	(30.1–)34.0±1.5(–36.7)	(18.4–)20.1±0.8(–22.7)	(1.5–)1.7±0.1(–1.9)
	(33.4–)36.4±1.6(–40.4)	(17.0–)18.7±0.8(–20.4)	(1.8–)2.0±0.1(–2.2)

[a] Polar length of pollen grains.

[b] Equatorial length of pollen grains.

[c] Average length.

[d] Standard deviations.

Table 7. Distribution of apomorphies in 20 *Vicia* species[a] and their infrageneric positions by different authors

Species	Stylar shapes[b]	Stigma shapes[c]	Pollen mesocolpium[d]	Sections (Kupicha 1976)	Sections (He and He 1994)	Sections (present study)
V. amoena	+	+	–	Vicilla	Vicilla	Vicilla
V. baicalensis	?	?	?	*	Vicilla	*
V. bifolia	+	+	–	*	*	Vicilla
V. chosenensis	?	?	–	*	*	Vicilla
V. fauriae	+	+	–	*	*	Vicilla
V. gigantea	?	?	–	*	Vicilla	Vicilla
V. hirticalycina	?	?	?	Vicilla	*	Vicilla
V. japonica	+	+	–	Vicilla	Vicilla	Vicilla
V. kioshanica	?	?	?	*	Vicilla	*
V. kulingiana	+	?	–	Vicilla	*	Vicilla
V. nipponica	+	+	–	Vicilla	*	Vicilla
V. pisiformis	+	?	–	Vicilla	*	Vicilla
V. pseudo-orobus	+	+	–	Vicilla	Vicilla	Vicilla
V. ramuliflora	?	?	?	*	Vicilla	*
V. unijuga	+	+	–	Vicilla	Vicilla	Vicilla
V. venosa var. *cuspidata*	+	+	–	Vicilla	Vicilla	Vicilla
V. amurensis	–	–	+	Vicilla	Vicilla	Amurense
V. dichroantha	–	–	+	Vicilla	*	Amurense
V. nummularia	–	–	+	*	*	Amurense
V. tibetica	–	?	+	*	*	Amurense

[a] Except *V. pisiformis*, an European species, other 19 are East Asian species.
[b] + = dorsally compressed style, – = terete style.
[c] + = conical stigma, – = globose stigma.
[d] + = swollen mesocolpium, – = plain mesocolpium.
*Species not treated.

Table 8. Diagnostic characteristics of species of sect. Amurense

	Vicia amurensis[a]	*V. tibetica*[b]	*V. dichroantha*[c]	*V. nummularia*[d]
Flower color	purple[e]	purple	yellow	yellow
Relative width between banner and claw of standard petal	banner>claw	banner>claw	banner≥claw	banner<claw
Leaflet number per one leaf	10–16	6–14	8–10	4–14
Leaflet length (mm)	15–30	5–20	15–55	4–14
Leaflet width (mm)	8–12	2–7	7–10	2–6
Distribution of stomata on leaf surfaces[f]	H-am	E-am	H-am	E-am
Polar length of pollen grains (μm)	27.0–31.5	28.4–31.2	31.7–37.3	39.8–43.2

[a] Data about leaflet from Ohashi (1982).
[b–d] Data about leaflet from Li (1993).
[e] Purple = bluish or reddish purple.
[f] H-am = hypo-amphistomatic, E-am = epi-amphistomatic.

HUNGARIA. Filarszky: June 26, 1902 (H).

CZECHOSLOVAKIA. Bohemia: J. Suza, June, 1925 (H).

V. pseudo-orobus Fisch. & Mey.

JAPAN. Tochigi Pref.: Y. Tateishi et al. 9895 (TUS). Nagano Pref.: T. Nemoto 1971 (TUS); Y. Endo 2427 (TUS). Okayama Pref.: Y. Endo 799 (TUS). Kumamoto Pref.: Y. Endo 800 (TUS).

V. tibetica Prain

TIBET. Karta: F.K. Ward 11713 (TI). Rima: F.K. Ward 19307 (TI).

V. unijuga A. Br.

JAPAN. Hokkaido Pref.: H. Takahashi et al. 127 (TUS). Miyagi Pref.: S. Ogawa et al., July 8, 1983 (TUS); Y. Endo 385 (TUS); (Cult. l.c.), Y. Endo 587 (TUS). Ishikawa Pref.: Y. Endo 816 (TUS). Kyushu: Y. Endo 821 (TUS).

V. venosa (Willd.) Maxim. var. *cuspidata* Maxim.

JAPAN. Nagano Pref.: O. Shimoda, July 6, 1981 (TUS); (Cult. l.c.), Y. Endo 495 (TUS); (Cult. in Yamanashi Pref.), Y. Tateishi, June 21, 1981 (TUS). Toyama Pref.: Y. Endo 2423.

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遠藤泰彦[a], 大橋広好[b]: **東アジア産ソラマメ属植物の属内における分類学的位置**

東アジアに産するソラマメ属植物16種類について，属内における分類学的位置を検討した．その結果，全種類が **Vicilla** 亜属に所属することを確認した．このうち，5種類については，同亜属への所属を初めて明らかにした．さらに，亜属内では，9種類が **Vicilla** 節に所属することを再確認し，3種類が，新たに **Vicilla** 節に所属することを明らかにした．残りの4種類（***Vicia. amurensis*** **Oettingen**, ***V. dichroantha*** **Diels**, ***V. nummularia*** **Hand.-Mazz.** 及び ***V. tibetica*** **Fisch.**）については，**Vicilla** 節に含められないことが明らかとなった．このため，**Vicilla** 亜属に新節 **Amurense Y. Endo & H. Ohashi** を設立し，ここに位置づけた．この **Amurense** 節の特徴は，花粉の溝間域（赤道観での）が膨らむこと，花柱が円柱状となること，花柱表面は有毛で，この毛が花柱の背軸側からはえ始めること，柱頭が球形であることである．この節の和名はノハラクサフジ節と新称したい．

（[a]千葉県立中央博物館植物学研究科，
[b]東北大学大学院理学研究科生物学教室）